

## REMARKS

Claims 1-6 were examined and reported in the Office Action. Claims 1, 2, 4 and 5 are rejected. Claims 1 and 4-6 are amended. Claims 1-6 remain.

Applicant requests reconsideration of the application in view of the following remarks.

### I. 35 U.S.C. § 103

A. It is asserted in the Office Action that claims 1, 2 and 4 are rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over JPO 02001030886 issued to Hirano ("Hirano"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))." *"All words in a claim must be considered in judging the patentability of that claim against the prior art."* (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Applicant's amended claim 1 contains the limitations of "[a]n apparatus for controlling vehicle brake using brain waves, comprising: a brain wave detector for detecting a central beta rhythm obtained from one of a central region, a parietal region and a frontal region of a scalp of a driver's brain waves appearing before the driver's

movement to step on a brake pedal after determining driving conditions; a brain wave amplifier for amplifying the brain waves detected by the brain wave detector; an A/D converter for converting the brain waves amplified by the brain wave amplifier into a digital data; and a controller for sensing the driver's movement for braking by analyzing the brain waves converted into the digital data in the A/D converter and then generating a command for braking the vehicle."

Applicant's amended claim 4 contains the limitations of "[a] method for controlling vehicle brake using brain waves, comprising: detecting a central beta rhythm obtained from one of a central region, a parietal region, and a frontal region of a scalp of a driver's brain waves appearing before the driver's movement to step on a brake pedal after determining driving conditions; amplifying the central beta rhythm; A/D converting the amplified central beta rhythm from analog data into a digital data; and controlling a vehicle brake, the controlling including: sensing the driver's movement for braking by comparing the central beta rhythm that was converted into the digital data in the A/D converting with a reference brain wave, and generating a command for braking the vehicle."

It is asserted in the Office Action that "Hirano teaches a brain wave detector for detecting a central beta rhythm of a driver's brain waves appearing before the driver's movement to step on a brake pedal after the step of determining driving conditions; a brain wave amplifier for amplifying the brain waves detected by the brain wave detector; a controller for sensing the driver's movement for braking by analyzing the brain waves converted into the digital data and then generating a command for braking the vehicle." It is also asserted that Hirano does not teach an A/D converter for converting the brain waves amplified by the brain wave amplifier into a digital data." A translation of Hirano, however, discloses an A/D converter.

Hirano, however, does not teach a brain wave detector for detecting a beta rhythm of 18 - 26 Hz (i.e., central beta) from a driver's brain waves appearing before the driver's movement to step on a brake pedal after the step of determining driving conditions. That is, Applicant's claimed invention detects the central beta rhythm, whereas Hirano teaches  $\theta$  (theta) waves or  $\delta$  (delta) waves. One skilled in the art

should know that  $\theta$  waves and  $\delta$  waves are very distinguishable from beta waves. In Applicant's claimed invention the central beta rhythm can be obtained from the central region, the parietal region or the frontal region of the scalp. For example, Applicant's claimed invention uses the central beta rhythm of 18 - 26 Hz, because the mu rhythm of 10 - 12 Hz in frequency of the brain waves that were widely used in the prior art, may be contaminated due to slow waves caused by eye blink, respiration, or the like.

It should also be noted that beta (highly alert and focused) waves fall between 14-30Hz, delta (deep sleep) waves fall between 0.5-4 Hz, and theta (drowsiness, also first stage of sleep) waves fall between 4-8Hz. Through using the central beta rhythm, Applicant's claimed invention controls the brake using the characteristic of the brain waves appearing before his or her movement in the course of stepping on the brake pedal for braking in a dangerous condition. Hirano, however, only teaches that an engine brake is controlled in a condition that a driver is likely to doze off through using theta waves or delta waves.

Through the unique configuration of Applicant's claimed invention, the new effect is that it can operate the brake faster and prevent a condition where the brake is operated in an unwanted situation to avoid a traffic accident in advance. Further, Applicant's claimed invention has advantageous effects in that it does not require a driver's specific intentional behavior or psychological action except for natural behavior for braking (movement to step on the brake pedal) and it also has the convenience for a user by allowing the user to mount a headphone type brain wave detector.

Hirano does not teach, disclose or suggest the limitations contained in Applicant's amended claims 1 and 4, as listed above. Since Hirano does not teach, disclose or suggest all the limitations of Applicant's amended claims 1 and 4, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claims 1 and 4 are not obvious over Hirano in view of no other prior art since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 1, namely claim 2, would also not be obvious over Hirano in view of no other prior art for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 1, 2 and 4 are respectfully requested.

**B.** It is asserted in the Office Action that claim 5 is rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Hirano in view of U. S. Patent No. 6,175,762 issued to Kirkup et al ("Kirkup"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claim 5 directly depends from claim 4, which is discussed above in section I(A) regarding Hirano.

Kirkup discloses an EEG based activation system that may be used to turn an appliance ON or OFF. Kirkup discloses the use of Alpha waves (8-14Hz, relaxed but alert). Kirkup does not teach, disclose or suggest "detecting a central beta rhythm obtained from one of a central region, a parietal region, and a frontal region of a scalp of a driver's brain waves appearing before the driver's movement to step on a brake pedal after determining driving conditions."

Neither Hirano, Kirkup, nor the combination of the two teach, disclose or suggest the limitations contained in Applicant's amended claim 4, as listed above. Since neither Hirano, Kirkup, nor the combination of the two teach, disclose or suggest all the limitations of Applicant's amended claim 4, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 4 is not obvious over Hirano in view of Kirkup since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 4, namely claim 5, would also not be obvious over Hirano in view of Kirkup for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection for claim 5 is respectfully requested.

**II. Allowable Subject Matter**

Applicant notes with appreciation the Examiner's assertion that claims 3, 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant respectfully asserts that claims 1-6, as they now stand, are allowable for the reasons given above.

**CONCLUSION**

In view of the foregoing, it is submitted that claims 1-6 patentably define the subject invention over the cited references of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes a telephone conference would be useful in moving the case forward, he is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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Dated: October 28, 2004

By: \_\_\_\_\_

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I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on October 28, 2004.

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Jean Svoboda